



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicant : Richard E. Milhem
Serial No. : 09/934,936
Filed : August 22, 2001
Title : DUAL CURE POLYUREA COATING COMPOSITIONS
Docket No. : RED 0001 PA/31805.1
Art Unit : 1711
Examiner : Rachel F. Gorr

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

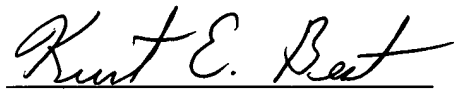
DECLARATION OF KURT E. BEST

I Kurt E. Best, hereby declare and say as follows:

- 1) I am Kurt E. Best, Development Scientist at Bayer MaterialScience LLC.
- 2) I have been employed by Bayer MaterialScience LLC and its predecessor companies since 1984 and have worked in the coatings field since 1986.
- 3) I have studied Luthra U.S. Patent No. 5,736,604 and U.S. Patent Application 09/934,936.
- 4) I understand that the Examiner in the office action of March 29, 2004 in Application 09/934,936 is relying on Example 1 of U.S. Patent No. 5,736,604 as anticipating certain pending claims in that application.
- 5) Application 09/934,936 discloses using aliphatic polyisocyanates such as biuret or trimer polyisocyanates in the coatings. U.S. Patent No. 5,736,604 uses a hydrophilic modified adduct. These typically increase hard dry, as define by the Gardenter Dry Time meter. So the coating of Example One of U.S. Patent No. 5,736,604 is drying slower than those disclosed in the application. Pot life is also affected by the modified adduct. In this case, it decreased. I believe the modified adduct helps incorporate water into the polyisocyanate containing matrix. Water is

an efficient catalyst for aspartates. On a practical note, the isocyanate used in the '604 patent will reduce pot life, increase dry time, and in high humidity environment cause a slow curing coating like Example 1 to bubble with thicker coatings (e.g., 6 mils DFT). The bubbles render it useless for practical application. There is a fine balance between cure speed, index, adhesion, and film build with regard to a truly useable coating. Therefore, in my opinion, the coating of Example One is not a commercially usable coating at a high thickness.

6) A second point that should be addressed is dual cure claimed in Application 09/934,936. U.S. Patent 5,736,604 does not address dual cure at all. It simply shows that over indexing an aspartate will cure. This example has little practical use because a standard 2K acrylic urethane or polyester can be formulated to meet these dry times. I believe that Application 09,934,936 coating's cure and excessive polyisocyanate is contributing to the improved adhesion. This is specifically true for a fast curing coating as described in Table 3 of the Application 09,934,936. It is well known that polyureas can have poor adhesion and the faster they cure the more this becomes a problem. The over indexing addressed this problem. I do not find this surprising. OH functional systems have used this to their advantage for years. I did find it surprising that the increased index did not drastically affect dry time.



Signature

July 26, 2004

Date



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Sir:

DECLARATION OF RICHARD E. MILHEM

I Richard E. Milhem, hereby declare and say as follows:

1) I am Vice President, Technology and Marketing, for Freda Incorporated, manufacturers of industrial paints/coatings. *Although my position with Freda is a marketing position, R.E.M. 7/26/04* I have nearly 30 years of experience in the coating industry and by reason thereof am qualified to comment on the various aspects of polyurea coatings.

2) I am the named applicant in the above identified application and am familiar with it. I have studied the office action of March 29, 2004 and the prior art relied upon by the examiner.

3) I understand that the examiner in the office action of March 29, 2004 is relying on U.S. Patent No. 5,736,604 (Luthra) as anticipating claims 29-43 in the application and on Luthra and Roesler (U.S. Patent No. 6,458,293) as rendering obvious claims 22-28.

4) In the first place Luthra relates to an aqueous polyurea coating. Over-indexing of aqueous polyurea coatings is common, but those coatings have totally different formulation parameters from non-aqueous ones of the type claimed in the above-identified application. The water in an aqueous system reacts with the polyol in the system to a greater or lesser extent.

If we look at Example 2 in Table 1 Luthra where the iso is Desmodur 302 then we have 1.76 equivalence on NCO in that example. If 100% of the water reacts and 100% of the polyol reacts this coating has 2.695 equivalence of polyol material and we are grossly under indexed. If half the water

reacts we are at an index of ~1.0:1.0. If 25% of the water reacts we are at ~1.3:1.0 index. The point is with all the water present and depending on the environmental conditions (hot and high humidity being the worst case) we really can't define an index for this coating and every time it dries we have a different crosslinked coating. It's going to be all over the board depending on how much water reacts with the iso. In the coating of the present invention this is not an issue. The iso can only react with the aspartate and it does it on a consistent bases.

You can make this case with the rest of Luthra and the various water amounts. The more water the bigger the difference.

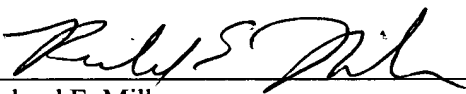
5) Comparative Example One (1) of Luthra does not contain water, but that example is also different from the invention recited in claims 29-43 (as amended) in that it dries in a significantly longer period of time. Claims 29-43 (as amended) recite a "dry to handle" time of less than 120 minutes. The closest to that drying test in Luthra is the "surface dry" time. Even then the surface dry time in Luthra is 13 hours, over 6 times the maximum recited in claims 29-43. The "dry to handle" test is much more rigorous in that it is based on production finishing conditions whereas the "surface dry" test is just a surface rupture test and so if an "apples-to-apples" comparison were made the disparity would be even greater.

6) Any over-indexed polyurea coating, such as the aqueous ones of Luthra, will eventually cure. The key is that it be fast enough to be dry for handling to be useful. Luthra does not disclose a non-aqueous polyurea coating that is useful.. In addition, it is noted the coating in Example One of Luthra failed the HCl and Acetic Acid tests whereas the claimed coatings did not (see Example 3 of the above-identified application). That, too, demonstrates that the coating of Example One of Luthra is not useful and is different from the one claimed.

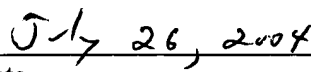
7) Those in the industry who have seen the claimed system have expressed surprise that it works in achieving a dual cure phenomena that combines the fast cure of a polyaspartic ester polyurea reaction with the enhanced adhesion and superior film properties of a slower moisture cure polyurea.

8) For the reasons stated above Luthra does not anticipate, or render obvious, claims 29-43 (as amended).

9) Likewise, the combination of Luthra and Roesler would not render claims 22-28 obvious to one of ordinary skill in the art. Rather, Luthra and Roesler teach away from that combination of references in that Luthra suggests that an aqueous polyurea coating be used rather than a non-aqueous one (the comparative examples are just that comparative, showing a preference for the aqueous system); whereas, Roesler suggests that a normal stoichiometric, non-aqueous system be used. Besides, if the references were combined in the manner suggested, it would destroy the intended functions. Luthra's whole intent is to provide an aqueous polyurea coating composition. Removing water would defeat that intent. The whole purpose of Roesler is to make a non-aqueous polyurea coating. Adding water would defeat his intent.



Richard E. Milhem



Date